STAFF WORKING PAPERS

SIMULATING THE REVENUE EFFECTS OF CHANGES IN THE TAXATION OF CAPITAL GAINS

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This Staff Working Paper was prepared by Eric Toder and Larry Ozanne under the supervision of Rosemary D. Marcuss. Frank Sammartino performed the simulations, and both he and Joseph Cordes provided extensive advice. Questions regarding this paper may be addressed to Larry Ozanne (202) 226-2684.

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I. INTRODUCTION AND SUMMARY

In March 1988, the Congressional Budget Office (CBO) issued a report analyzing the historical evidence on how capital gains taxation affects revenue.[1] The report provided new statistical estimates of how much taxpayers change their realization of capital gains in response to changes in tax rates on those gains. Using those estimates in simulations of the permanent revenue effects of tax changes, the report concluded that, aside from transitional effects, the Tax Reform Act of 1986 (the 1986 act) most likely raised revenue from capital gains taxes and that proposals to reduce capital gains rates from current levels to a flat 15 percent rate would probably reduce revenue.

In June 1988, the Office of the Assistant Secretary for Economic Policy of the U.S. Treasury Department (OEP) published a report criticizing the revenue simulations of the CBO report.[2] In its report, OEP used an alternative procedure for calculating revenue which, even though it used CBO's statistical estimates, found that the reductions in the capital gains tax rates in both the Revenue Act of 1978 (the 1978 act) and the Economic Recovery Tax Act of 1981 (ERTA) raised revenue. OEP concluded that the difference between its finding that revenue increased as a result of these capital gains tax cuts and CBO's finding that revenue would fall if current rates were reduced to 15 percent was attributable to inconsistencies in the CBO simulation method. The OEP report, however, did not contain any simulation of the reduction in current rates to 15 percent.

This update to CBO's March 1988 report shows that the OEP criticisms of the CBO simulations are of minor quantitative importance. In one case, for example, the procedure used in the CBO report finds that reducing current capital gains rates to 15 percent would lower revenues by $6.7 billion per year; when the procedure is adjusted in response to the OEP criticism, the revenue loss is $6.9 billion. Thus the original revenue findings of the CBO report are essentially reaffirmed.

The recent proposal by the Bush Administration to reduce capital gains tax rates differs from the flat 15 percent rate proposal simulated in the March 1988 CBO report and resimulated in this paper. Unlike the simulated proposal, the Bush Administration proposal would lower the capital gains tax rate for persons paying at the 15 percent rate under current law. All taxpayers would be allowed a 45 percent exclusion of realized gains, and those with incomes under $20,000 would be allowed a full exclusion. Also, unlike the simulated proposal, the Bush proposal would preclude depreciable assets like buildings from using the lower rates, and it

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[1] Congressional Budget Office, *How Capital Gains Tax Rates Affect Revenues: The Historical Evidence* (March 1988).

[2] Michael R. Darby, Robert Gillingham, and John S. Greenlees, "The Direct Revenue Effects of Capital Gains Taxation: A Reconsideration of the Time Series Evidence," *Treasury Bulletin* (June 1988), pp. 2 to 2-8.

would require that as of 1995 assets be held for at least three years to qualify for the lower rate.

The Bush proposal is similar to the one in the CBO report in the important respect that it places a top rate of 15 percent on capital gains for those paying 28 percent or 33 percent under current law. Because most capital gains would be realized by taxpayers in these tax brackets, and most gains would be eligible for reduced rates under the Bush proposal, the revenue simulations in the CBO report are broadly consistent with the revenue effects that the Joint Committee on Taxation projects for the Bush proposal.

In addition to revising CBO's previous simulations of the effects of taxing capital gains at 15 percent, this paper also evaluates OEP's revenue estimates of ERTA. Unlike OEP, CBO finds that, aside from transitional effects, ERTA's reduction of capital gains tax rates reduced tax revenue. According to CBO's simulation for 1984, ERTA reduced capital gains revenue by $1.7 billion compared with the revenue that would have been raised had the tax law of 1980 remained in effect. For the same year, in contrast, OEP finds that ERTA raised revenue by $1.7 billion. The difference has three causes. First, OEP does not remove the revenue increases caused by the Tax Equity and Fiscal Responsibility Act. Second, OEP relies on an implausible representation of how capital gains would have been taxed had ERTA not been enacted. Third, the CBO and OEP studies each use different variables, especially measures of marginal tax rates.

The focus of this paper is on the narrow issue of the appropriate way to simulate changes in federal individual income tax revenue from the taxation of capital gains, given an estimate of how taxpayers adjust their realizations of gains in response to changes in the tax rate on those gains. This paper does not address the estimates of how taxpayers respond to capital gains tax changes. As emphasized in the earlier CBO report, the degree of uncertainty in existing statistical estimates of this response is large enough to affect the revenue estimates substantially. Furthermore, revenue can be affected in ways that these statistical estimates and simulations omit entirely; changes in capital gains tax rates can affect income tax revenue either through shifts in the composition of capital income or through changes in the level of saving, innovation, and growth. Finally, this paper does not address issues other than the revenue effect that also must be considered in assessing the taxation of capital gains, such as the effects of the taxation of capital gains on the economy at large and on the distribution of the tax burden. These broader considerations of tax policy should not be overlooked in the continuing debate about the revenue effects of taxing capital gains.

Chapter II of this paper summarizes the earlier CBO report and the OEP report. CBO's revised simulations, which respond to OEP's criticism, appear in Chapter III. Chapter IV applies the revised CBO simulation method to estimate ERTA's effect on capital gains revenues and then explains the difference between this estimate and the corresponding estimate reported by OEP.

II. HIGHLIGHTS OF THE CBO AND OEP STUDIES

This chapter summarizes the methodology and major findings of both the March 1988 report by the Congressional Budget Office and the June 1988 report by the Office of Economic Policy.

THE CBO REPORT

The CBO report, *How Capital Gains Tax Rates Affect Revenues*, reviewed previous studies on the subject, presented new statistical estimates of how taxpayers adjust their realizations in response to changes in capital gains tax rates, and then used the new statistical estimates to simulate the revenue effects of two changes in the tax law.

The effect of capital gains taxation on revenues has been the subject of extensive debate and study since the mid-1970s. The studies have consistently found that higher tax rates on capital gains discourage realizations, but considerable disagreement exists as to whether realizations would be sufficiently discouraged by a particular tax rate increase to offset the direct revenue gain from higher rates. The effects of a decrease in tax rates on capital gains are also disputed.

In its report, CBO developed new estimates of how capital gains realizations respond to tax rates on capital gains. Tax rates were found to have a statistically negative effect on realizations, after controlling for other influences, but the standard errors of these estimates were large. The form of the estimated equations allowed computation of what is called the revenue-maximizing tax rate--the tax rate that would maximize revenues if the tax schedule were simply a flat rate. The most likely revenue-maximizing rate was between 26 percent and 32 percent. Because of the standard errors of the estimates, though, revenue-maximizing rates as low as 17 percent and as high as 100 percent could not be ruled out.

Although revenue-maximizing flat rates suggest how tax rate changes would affect revenues, the actual tax rate schedule is graduated, not flat. In its March report, therefore, CBO simulated two tax law changes in which all relevant aspects of the tax law were represented. One change was the Tax Reform Act of 1986 (the 1986 act), which raised the tax rate on capital gains for most taxpayers. The other change was a proposal to replace the current rate structure with a flat 15 percent rate on capital gains. The revenue effect was computed using a "microsimulation" in which the estimated response of capital gains realizations was applied to a sample of actual tax returns (updated to 1988) to calculate the change in realizations and revenues for the entire population. The simulations found that a decline in realizations in response to the 1986 act's increases in tax rates on capital gains would offset most of the revenue gains from the rate increases, with the most likely net revenue gain being between $2.5 billion and $5.8 billion (at 1988 income levels). Capping the tax rate at 15 percent instead of the 28 percent and 33 percent rates in current law was estimated to reduce revenues from capital gains taxes by between $3.9 billion and $7.8 billion (at 1988 income levels). These estimates reflect the

permanent effects of the tax changes and abstract from transitional effects that may occur when the tax changes are made.

THE OEP STUDY

The OEP study appraised both the CBO report and the time-series analysis in the U.S. Treasury's 1985 report to the Congress on capital gains.[1] Like the CBO report, the 1985 Treasury report estimated the effect of tax changes on taxpayers' realization of capital gains, and then used the estimated response to simulate two tax law changes--the capital gains tax reductions in the Revenue Act of 1978 and the Economic Recovery Tax Act of 1981. The rate reductions in the 1978 act were found to raise revenue in 1979, to have an insignificant revenue effect in 1980, and to lower revenue in 1981 and 1982. The capital gains tax reductions in ERTA were found to lower revenue in 1981 and 1982.

The OEP study criticized the 1985 Treasury report's time-series equations for the realizations response and instead estimated OEP's preferred specifications, which entailed making two changes. OEP extended the data from 1982 to 1985 and replaced the linear equation in the 1985 report with four alternative functional forms, all of which use the logarithm of capital gains as the dependent variable. With these changes, the equations reestimated by OEP closely parallel equations in the CBO report, and the estimated response to changes in tax rates is only slightly smaller than that found by CBO.[2]

OEP then calculated the revenue effects of the 1978 act and ERTA using the same simulation method as the Treasury report but substituting its four reestimates of taxpayer response. In contrast to the Treasury report, OEP found that the 1978 act raised revenue in all years from 1979 through 1982, and that the 1981 act lost an insignificant amount in 1981 and then raised revenue in 1982. OEP extended the Treasury simulation method through 1985 and found that both acts raised revenue in each additional year.

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[1] Office of the Secretary of the Treasury, Office of Tax Analysis, *Report to Congress on the Capital Gains Tax Reductions of 1978* (September 1985). This report used two different estimating methods: time series and cross section. Simulations using the cross-section estimates, not discussed further in this report, found that the reductions in capital gains tax rates in both the 1978 and 1981 acts raised revenue (see pp. 166-174). Appendix B of the CBO report assesses the time-series and cross-section estimating methods.

[2] The smaller response estimated by OEP partly reflects differences in the marginal tax rate series used. OEP uses the tax rate series from the 1985 Treasury report, which used the marginal tax rate on capital gains for taxpayers with income over $200,000 as a proxy for the marginal tax rate on gains for the entire population. In contrast, the CBO report used a weighted average marginal tax rate on capital gains for the entire taxpaying population (construction of the average is explained in the next section). Tax rates for high-income taxpayers changed more over the estimation period than did rates for other taxpayers, resulting in a smaller estimated coefficient when the rate paid by high-income taxpayers is used as a proxy for the marginal rate faced by the entire population.

Given its findings that the 1978 and 1981 reductions in capital gains rates raised revenue, OEP investigated why the CBO report found that revenue dropped when tax rates were reduced to a flat 15 percent rate. OEP settled on two explanations. First, OEP pointed out an inconsistency between the CBO simulation method and CBO's statistical estimates of the realizations response. CBO used the estimated aggregate response of realizations to marginal tax rates to simulate the response of each taxpayer in a sample of individual tax returns. As OEP pointed out, however, when the predicted variable is expressed as a logarithm, the sum of the separate responses of each individual using the estimated regression coefficient is not equal to the aggregate response predicted by the equation. Second, OEP argued that CBO's simulations of the 1986 act are invalid because they require simulation of changes in marginal tax rates that are outside the historical range of marginal tax rates underlying CBO's main estimating equations.

EVALUATION OF OEP CRITICISMS

Neither of OEP's criticisms accounts for much of the difference between the CBO and OEP revenue findings. OEP correctly identifies an inconsistency between CBO's estimated aggregate realizations response and the aggregate change in capital gains realizations implied by CBO's microsimulation method. As demonstrated in Chapter III, however, the inconsistency is of minor quantitative importance, and adjusting for this inconsistency does not significantly affect the conclusions of the CBO report.

The second OEP criticism--that CBO is simulating tax rates outside the range of its statistical estimation--is of minor relevance. While the average marginal tax rate on capital gains in the 1986 act is outside the range of the historical experience used in CBO's aggregate regressions, CBO also reported estimates of equations for the top 1 percent of the population, a group that accounted for about half of all capital gains realizations in 1984. The equations for the top 1 percent include as data points marginal tax rates higher than the maximum rate in 1986, and the realizations responses estimated in these equations are virtually the same as those reported in the aggregate equations and used in CBO's simulations. Moreover, the average marginal tax rate under the proposed 15 percent maximum rate is within the range of historical experience for the entire sample of taxpayers.

The difference between the CBO and OEP revenue findings is largely attributable to differences in the legislation each considers and to shortcomings in OEP's method of calculating revenue effects. Remaining small differences in revenue findings result from different choices of marginal tax rates and from other differences in the data.

III. REVISED SIMULATIONS OF THE 1986 ACT AND A MAXIMUM 15 PERCENT RATE

In response to the Office of Economic Policy's criticism, the Congressional Budget Office adjusted its simulation method to account for the inconsistency noted by OEP and to incorporate minor technical improvements. The revised simulations reaffirm the findings of the original CBO report; the 1986 act is likely to raise revenue from capital gains, while a proposal lowering current rates to a flat rate of 15 percent is likely to lower revenue.

SIMULATIONS IN THE CBO REPORT

Knowledge of the procedure used to estimate revenue in the CBO report is the starting point for understanding both the inconsistency noted by OEP and the adjustments made in the simulations presented below. Essential features of the report's estimation and simulation methods follow.

Estimation of Realization Response

The CBO report used linear regression to estimate an equation in which total realizations of capital gains depend on the marginal tax rate on gains and other factors. The other factors used to explain the annual level of capital gains include the real value of corporate stock held by households, real gross national product, the change in real gross national product, and the price level. The equation can be expressed as:

$$\ln(LTG) = a(MTR) + b \ln(OTHER)$$

The equation was estimated using observations on total capital gains realized in each year from 1954 to 1985. Data on realizations of capital gains by individual taxpayers in successive years are available only for very short periods.

The dependent variable in the regression equation, ln(LTG), was the logarithm of net long-term gains, in excess of net short-term losses, on tax returns reporting net gains. Net long-term gains was used because only such gains have been eligible for preferential capital gains treatment over the sample period. Net short-term gains have always been taxed at the same rates as ordinary income.[1]

[1] The 1985 Treasury study and the OEP study use long-term and short-term gains as the dependent variable in their estimation, whereas CBO uses only long-term gains. As a result, findings in the separate studies are not strictly comparable. In practice, the change in variable definitions does not significantly affect the results because most realized gains are long term.

The term MTR refers to the measure of the weighted average marginal tax rate on net long-term gains used by CBO to estimate the equation described on the previous page.[2] This average marginal tax rate was calculated from published data on individual income tax returns using a multiple-step procedure designed to allow unbiased estimation of taxpayer response to tax rate changes.[3] The chief feature of this procedure is that it uses predicted capital gains instead of actual capital gains in computing marginal tax rates for each income class and as weights in averaging marginal rates among income classes. This measure of the average marginal tax rate is referred to as the "independent" marginal tax rate, to distinguish it from the weighted average marginal tax rate computed by using actual instead of predicted gains to compute tax rates and weights. Details on the purpose and construction of the independent rate appear in the box on the next page.

The coefficients "a" and "b" were estimated by ordinary least squares regression and show the extent to which the explanatory variables influence long-term gains. The tax rate coefficient "a," for example, is reported in Equation 2, Table 10, of the CBO report to be -0.0310, which means that an increase in the independent marginal tax rate of one percentage point reduces net long-term gains by 3.1 percent. This value for the parameter "a" is one of the values used in OEP's simulations, and CBO's resimulations are based on the same equation.

The estimated equations in the CBO report did not identify a transitional pattern of taxpayers' response as they adjust to changes in tax rates.[4] Yet realizations are likely to temporarily surge or drop around the time of such changes, as they appear to have done in 1986 and 1987. In the absence of a transitional pattern, CBO's estimates of the parameter "a" appear to refer to the permanent response remaining after any transitional adjustments. As a consequence, revenue estimates made using the CBO response parameter are assumed to reflect permanent effects--that is, effects as if the tax change had happened long before.

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[2] MTR is the variable in the equation that is not entered in logarithmic form. The choice of a semi-log relationship between long-term gains and the marginal tax rate on gains means that the absolute value of the elasticity of gains with respect to the marginal tax rate–that is, the percentage change in gains per unit percentage change in the marginal tax rate–increases as the marginal tax rate increases. Thus, a 10 percent increase in the marginal tax rate has an effect on realizations that is three times greater if the change in rates is from 30 percent to 33 percent than if the change in rates is from 10 percent to 11 percent. The use of a semi-log functional form allows computation of a marginal tax rate that maximizes revenue from capital gains taxes. For a more complete discussion of the choice of functional form and how it affects revenue simulations, see Congressional Budget Office, *How Capital Gains Tax Rates Affect Revenues*, especially Appendix A, pp. 73-95.

[3] Internal Revenue Service, *Statistics of Income, Individual Income Tax Returns*, 1954-1985.

[4] Congressional Budget Office, *How Capital Gains Tax Rates Affect Revenues*, pp. 74-75.

THE INDEPENDENT MARGINAL TAX RATE

To prevent a bias in the regression estimates, an average marginal tax rate on capital gains is needed that is independent of responses to changes in the capital gains tax rate. If marginal tax rates were computed with and weighted by the actual distribution of realized capital gains, the weighted average tax rate would be influenced in part by how legislated tax rate changes affect the distribution of gains. The coefficient of a regression of realized gains on tax rates would reflect some of this reverse feedback from realizations to the average tax rate and would thus be biased as an estimate of how a change in the tax law affects realizations.

For example, suppose that the gains-weighted average tax rate in 1988 was 25 percent and that the tax rate in each bracket was increased by one percentage point in 1989. Absent other influences, the average marginal tax rate on capital gains would rise by one percentage point in 1989. If, however, taxpayers in the 28 percent bracket reduce their gains by a larger percentage than those in the 15 percent bracket *in response to the tax increase* (as CBO's equation predicts), then their weight in the 1989 average of marginal rates will decline. This effect will give greater weight to the 15 percent bracket and less to the 28 percent bracket, and cause the actual average marginal tax rate to increase by less than 1 percent. As a result, the total change in realizations will appear to be caused by a change in marginal tax rates smaller than 1 percent, which will cause the estimated effect per unit of tax change to be too large.

The bias can be avoided by using measures of realized gains per adjusted gross income (AGI) class that are independent of changes in tax law. In the CBO report, this was done by predicting realized gains for each AGI class in each year with a regression equation that omitted any tax rate. The independent variables in the regression equation are the real value of corporate shares held by individuals, real AGI excluding capital gains, and the price level. The value of corporate shares in any year is distributed among AGI classes in proportion to reported dividends. The equation's estimated coefficients are used to predict realized gains in each AGI class for each year covered in the study (1954-1985). These predicted gains are substituted for actual gains in computing marginal tax rates within each AGI class and then used as weights to average the marginal tax rates among classes. The resulting average marginal tax rate should be independent of taxpayers' response to changes in tax rates.

Simulation of the Revenue Effect

The CBO report then used the estimated parameter "a" to simulate revenue from the 1986 act and from a proposed 15 percent maximum rate on capital gains. The revenue effects were calculated for 1988. The simulations were performed using the Internal Revenue Service's sample of 80,000 actual tax returns filed in 1984, which CBO then adjusted to 1988 levels assuming no changes in the tax law.[5] These returns are weighted to reflect total taxes paid in 1984, and CBO projected those weights to reflect total taxes paid in 1988. CBO has developed a tax calculator that can be applied to these tax returns to compute tax liability given a taxpayer's filing status, income, deductions, and other relevant characteristics; the tax calculator is modified to reflect actual or proposed changes in the tax law.

The first step in simulating the effect of the 1986 act on revenue from capital gains was to calculate the revenue attributable to capital gains under prior law. This revenue was calculated for each return as the difference between total taxes that would be paid under pre-1986 law and taxes that would be paid under that law if realized capital gains were zero. Capital gains revenue per return was then weighted and summed to give total revenue from capital gains. In the CBO report, this procedure found that $39 billion in taxes would be collected from capital gains realizations in 1988 if the 1986 act had not been passed.

The second step was to calculate the extent to which realizations of each return were changed by the 1986 act. To do this, CBO assumed that the realization response estimated in the aggregate equation applied to all individual tax returns. That equation can predict realizations under the act based on realizations under prior law, the change in marginal tax rates caused by the act, and the parameter "a". For each tax return, CBO calculated the change in marginal tax rates caused by the act, and combined this result with projected realizations in the absence of the act and the parameter "a". The result was a prediction of realizations per return under the 1986 act.[6]

The final step was to calculate revenue attributable to capital gains taxation under the 1986 act (that is, actual 1988 law). This step parallels the first step. For each return, realizations were changed to the predicted level, and taxes due under

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[5] The sample of 1984 tax returns was produced by the Statistics of Income Division of the Internal Revenue Service. It is a stratified sample that overrepresents high-income returns; the separate observations are weighted to add up to the entire taxpaying population. The different types of income were adjusted to 1988 levels according to CBO economic assumptions.

[6] The aggregate equation can be used to predict realizations under the 1986 act as follows:

$$LTG(2) = LTG(1) * EXP(a * (MTR(2) - MTR(1)))$$

where LTG is realized gains, EXP indicates the exponential, "a" is the estimated response parameter, MTR is the marginal tax rate, and the parenthetical (1) refers to tax law before the 1986 act, and the parenthetical (2) refers to tax law after the 1986 act.

Table 1. Estimates of Capital Gains Revenue from the March 1988 CBO Report (In billions of 1988 dollars)

Tax Law	Capital Gains Revenue: With Realization Response	Capital Gains Revenue: With No Realization Response
The Tax Reform Act of 1986		
Before 1986 Act	39.0	39.0
1986 Act	44.9	61.4
Effect of 1986 Act	+5.9	+22.4
Limiting Capital Gains Tax Rate to Flat 15 Percent Rate		
1986 Act	44.9	44.9
Flat 15 Percent Rate	37.1	26.1
Effect of Flat 15 Percent Rate	-7.8	-18.8

SOURCE: Congressional Budget Office, *How Capital Gains Tax Rates Affect Revenues: The Historical Evidence* (March 1988).

NOTE: Revenue effects of the proposed 15 percent flat rate with no taxpayer response differ from the corresponding effects in Table 16 of the CBO report. The difference arises because the effects here assume that realizations are fixed at levels resulting from the 1986 act, while the effects in the CBO report assumed realizations were fixed at levels before the 1986 act. Fixing realizations at levels under the 1986 act increases comparability to effects with a response.

the act were calculated. Realizations were then set to zero, and taxes were recalculated. The difference between taxes with simulated realizations and taxes with no realizations is the measure of revenue from capital gains taxes under the act. Aggregating over all returns, this procedure showed capital gains revenue of $44.9 billion under the act.[7] The difference between revenue from capital gains taxes under the act and under prior law was taken as the revenue effect of the change in

[7] As already discussed, the revenue calculation reflects just the permanent response to the 1986 act. It abstracts from the transitional effects of taxpayers' shifting realizations from 1988 to 1986 to avoid the tax rate increases beginning in 1987. The average tax rate on long-term gains in 1988 under the 1986 act is simulated to be 25 percent. The corresponding average of marginal tax rates is 26 percent.

the taxation of capital gains in the 1986 act, and the 1986 act was found to raise $5.9 billion in revenue in 1988 (see Table 1 on previous page).

The importance of allowing taxpayers to adjust their realizations in response to the tax change was shown by calculating the revenue that would be collected if realizations remained at the same level as they were projected to have been had tax reform not occurred. The CBO report found that the higher rates in the 1986 act would have raised $61.4 billion in revenue from capital gains, for a revenue increase of $22.4 billion (see Table 1); that is, about three-fourths of the revenue gain from the rate increase would be offset by taxpayer response.

The revenue effect of a flat 15 percent rate on capital gains was calculated in the same manner. The starting point was current law, which was found to raise $44.9 billion from taxation of capital gains. Realizations for each tax return with a top rate above 15 percent were then increased to reflect taxpayer response to the reduced rate, and revenue was recalculated. The result was $37.1 billion in revenue, for a $7.8 billion loss from current law.[8] As with the 1986 act, taxpayer responses offset much of the revenue effect from the rate changes (see Table 1).

REVISED SIMULATIONS OF THE 1986 ACT AND AND A FLAT 15 PERCENT RATE ON CAPITAL GAINS

The simulation procedure in the CBO report is revised here to account for the inconsistency pointed out by OEP. The simulations also incorporate several technical refinements that result in only modest changes in the revenue findings of the CBO report. The technical refinements are addressed first.

Technical Refinements

Review of the CBO simulation procedure prompted by OEP's criticisms uncovered four unrelated ways in which simulations could be improved. The first two listed below apply to all simulations in this paper; the third and fourth apply just to simulations of the proposed reduction of current capital gains tax rates to a flat 15 percent rate. None of these changes alters the findings of the March 1988 CBO report.

- Preliminary resimulations in response to OEP's criticisms revealed a number of taxpayers in the lower AGI classes who were subject to the alternative minimum tax (AMT). Estimates of taxpayer responses in the CBO report assumed that these taxpayers faced the regular tax schedule and paid very low rates on their realized gains. To test the importance of the minimum tax rates, CBO has reestimated the response parameter "a"

[8] As in the simulation of the 1986 act, realizations under the proposed 15 percent flat rate were set at their long-run predicted level. Transitional responses were ignored.

with tax rates that include the minimum tax in lower AGI classes. The reestimated parameter differs little from the estimate in the CBO report, -.0305 compared with the previous value of -.0310.[9]

- The second change for all resimulations is the elimination of short-term gains from the revenue calculations. The CBO report had included net short-term gains as well as long-term gains in its simulation of taxpayer responses and revenues. However, only long-term gains respond directly to the tax changes simulated. In the simulations below, therefore, only long-term gains (in excess of short-term losses) are included in taxpayers' responses and revenues.

- In simulating responses to the proposed 15 percent flat rate for capital gains, the CBO report had assumed that taxpayers subject to the AMT still faced a 20 percent tax rate. The resimulations below assume that the AMT rate would fall to 15 percent on capital gains.

- Although the regular tax rate on capital gains was 15 percent in the CBO report, taxpayers in the phaseout range for the personal exemption had a surtax of 5 percent added to their capital gains tax rate, bringing the total rate to 20 percent. Simulations in the current report have no surtax on capital gains, so the total tax rate never exceeds 15 percent on capital gains.

When the reestimated response parameter is substituted and short-term gains are removed, simulations find that the 1986 act raises revenue by $7.0 billion instead of by $5.9 billion as in the CBO report. The revenue increase from the 1986 act is larger because the removal of short-term gains reduces revenue under prior law by

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[9] The parameter "a" in the CBO report estimated the amount by which taxpayers change their realization of capital gains in response to a change in the marginal tax rate on those gains. That rate was measured by the independent marginal tax rate already described. This measure calculated the marginal tax rate for a representative taxpayer in each published AGI class for each year. If the representative taxpayer was subject to taxation on the regular tax schedule, then all taxpayers in the same AGI cell were also assumed to face that same marginal rate. In some situations, the representative taxpayer was subject to the alternative tax or the add-on minimum tax, and in these cases all taxpayers in the AGI class were also assumed to face marginal rates from that schedule. Most representative taxpayers in classes with AGI above $200,000 were subject to the alternative tax from 1954 through 1969, and then were subject to the minimum tax from 1970 through 1978. Representative taxpayers in lower AGI classes and in later years were all subject to rates from the regular schedule.

In the current report, greater weight has been given to the minimum tax by identifying two representative taxpayers in each AGI class. One taxpayer represented those on the regular schedule, and the second represented those who were on the minimum tax schedule in 1970 through 1978 or were subject to the alternative minimum tax in 1979 through 1985. For each year, the two representative taxpayers were averaged in proportion to their prevalence in their AGI class, and the resulting rate was averaged with other AGI classes using the predicted weights of the independent marginal tax rate. The resulting marginal tax rate series was similar to the independent marginal tax rate in the CBO report. Reestimation of the statistical equation changed the estimate of "a" slightly, as reported above.

more than it does under current law, where the reestimated response parameter is also influential (Table 2).

When all four refinements are included, the revenue from limiting capital gains tax rates to a flat 15 percent drops by $6.7 billion instead of by $7.8 billion as found in the CBO report. The revenue declined by less in the resimulation because the more complete reduction of tax rates to 15 percent increases the realizations response, which in turn leaves revenue higher under the 15 percent tax rate than was found in the CBO report (see Table 2).

Table 2. Effect of Technical Refinements on CBO Estimates of Capital Gains Revenue (In billions of 1988 dollars)

	Capital Gains Revenue	
Tax Law	CBO Report	Technical Refinements
The Tax Reform Act of 1986		
Before 1986 Act	39.0	37.8
1986 Act	44.9	44.8
Effect of 1986 Act	+5.9	+7.0
Limiting Capital Gains Tax Rate to Flat 15 Percent Rate		
1986 Act	44.9	44.8
Flat 15 Percent Rate	37.1	38.1
Effect of Flat 15 Percent Rate	-7.8	-6.7

SOURCE: Congressional Budget Office, *How Capital Gains Tax Rates Affect Revenues: The Historical Evidence* (March 1988); and CBO simulations.

NOTE: Revenue reflects permanent rather than transitional effects of tax changes. Revenue effects include taxpayers' response to rate changes.

Removing the Inconsistency with an Aggregation Adjustment

The Office of Economic Policy pointed out that the parameter "a", which CBO estimated for all taxpayers together, generally cannot also apply to each taxpayer individually. As a result, when CBO applied the parameter "a" to individual tax returns, the sum of responses would not equal the response predicted by the aggregate equation applied to the same taxpayers taken together.

An ideal way to resolve the inconsistency would be to estimate realization responses that apply to individual taxpayers. These responses then could be applied to individual tax returns to simulate revenue. However, individual responses must be estimated by following individual taxpayers over many years and such data are not available.

Another solution would be to calculate revenue from aggregate data on tax returns so that the aggregate response could be used directly, but would not be distributed among individual taxpayers. This is the approach used by OEP. Tax rates differ among taxpayers, however, and the revenue effects of a given tax law change depend on which taxpayers respond to that change and by how much. Thus any aggregate revenue estimate, including the one used by OEP, depends on an implicit distribution of the aggregate response among taxpayers, which is not acknowledged by the authors. Implicit distributions are less desirable than explicit ones because they cannot be scrutinized for plausibility. In addition, OEP's aggregate method cannot be applied to proposed tax changes like the 15 percent flat rate because it relies on historical data.

The best practical solution, in CBO's judgment, is to continue to apply the parameter "a" to obtain an initial response per tax return, and then to adjust the individual responses proportionately so they sum to the response predicted by the aggregate equation. The resulting distribution is reasonable in that taxpayers with similar changes in tax rates have similar percentage changes in realizations, and those with larger changes in marginal tax rates have larger percentage changes in their realizations. At the same time, the total change in realizations matches that predicted by the aggregate equation, given the change in the average marginal tax rate on capital gains.

This allocation procedure is only one of many possible ways to distribute the aggregate response among individual tax returns. Alternative distributions might have the realizations response parameter "a" differ systematically among taxpayers according to other taxpayer characteristics. A commonly suggested pattern is for the response to be greater for taxpayers at higher income levels. If "a" differs among taxpayers at different income levels, and therefore in different tax rate brackets, the estimated revenue effect of a tax proposal would change depending on whether the absolute change in marginal tax rates was larger or smaller in the higher brackets.

To test for the possibility of systematically different responses among income groups, the CBO report estimated separate equations for the top 1 percent and bottom 99 percent of returns for four separate equation specifications (see Tables

12 and 13, of that report). No statistically significant difference in "a" was found in any specification; and for the specification used in the resimulations below, the estimated percentage change in realizations per unit change in marginal tax rates for the two groups was almost equal.

Although the CBO report did not find evidence of different responses among taxpayers, simulations using more complete data might find such differences. Consequently, the sensitivity of revenues to alternative distributions of the aggregate response is explored in the revised simulations presented in this chapter and the simulations of ERTA in Chapter IV.

Calculating the Aggregate Realization Response. The revised CBO simulation method includes two new steps: calculating the aggregate response, and scaling individual responses to sum to that aggregate response. Scaling the individual responses is done simply by multiplying each individual response by the ratio of the aggregate response to the sum of individual responses. Calculating the aggregate response, however, requires further explanation.

In CBO's equation, the aggregate change in realizations in response to a change in the tax law depends on the initial level of realizations, the parameter "a", and the change in the average marginal tax rate (see footnote 6 in this chapter). The last of these is obtained by averaging the change in marginal tax rates of individual tax returns, using as weights the actual amount of realized gains represented by each return.[10] According to this method, the 1986 act raised the average marginal tax rate on capital gains by 9.19 percentage points from a previous average of 17.38 percent. This change and the parameter "a" indicates that the 1986 act reduces realizations to 75.6 percent of what they would have been in 1988 without the act (ignoring transitional shifts). Projecting the 1984 sample of returns to 1988 shows realizations of $236.0 billion in the absence of the act, so response to the act reduces realizations to $178.3 billion. Responses per return are scaled so that realizations under the act sum to $178.3 billion.

The same procedure and tax returns are used to calculate the aggregate response to a flat 15 percent capital gains tax rate. Marginal tax rates are calculated twice for each return--once under current law as specified by the 1986 act, and a second time with a flat rate of 15 percent on capital gains. The difference in marginal tax rates is averaged over all returns using actual gains as weights to give the change in the average marginal tax rate. In this case, the average marginal rate

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[10] The same change in average marginal tax rates occurs if those rates are calculated under both tax changes and then differenced. This procedure was usually used rather than calculating the change per return and then averaging. The weights used were the product of the sampling weight of the return and CBO's projected level of capital gains realizations in 1988 had tax reform not been passed.

An alternative method of calculating the change in the average marginal tax rate follows the procedure for calculating the independent marginal tax rate. Use of the independent marginal tax rate generally finds revenue effects similar to those found in this report. One example is shown in Table 7 of Chapter IV.

falls by 11.92 percentage points from the average marginal rate of 26.57 percent under current law. This fall in average marginal tax rates and the parameter "a" indicate an increase in realizations of 43.8 percent, from $178.3 billion to $256.5 billion. Each return's response is scaled so that realizations under the 15 percent rate on capital gains sum to $256.5 billion.

Effect of the Aggregation Adjustment. When the aggregation adjustment is made, the 1986 act is found to raise $6.8 billion in capital gains revenue instead of $7.0 billion. Thus, removing the inconsistency pointed out by OEP reduces the revenue effect of the 1986 act by just $0.2 billion (see Table 3). The revenue effect is small because the sum of realizations responses from the individual tax returns is close to the realizations response predicted by the aggregate equation. Realizations in 1988 are projected to be $236.0 billion in the absence of tax reform. Tax reform is calculated to reduce realizations by $56.9 billion using the sum of responses per tax return and by $57.7 billion using the aggregate equation. This 1 percent discrepancy in realizations has an inconsequential effect on revenue from the 1986 act.

When the aggregation adjustment is made for simulations of the proposed reduction of capital gains rates to 15 percent, the revenue loss increases to $6.9 billion from $6.7 billion. Again, the inconsistency pointed out by OEP has an inconsequential effect of $0.2 billion (see Table 3).

Table 3. Effect of the Aggregation Adjustment on CBO Estimates of Capital Gains Revenue (In billions of 1988 dollars)

	Capital Gains Revenue	
Tax Law	Technical Refinements	Aggregation Adjustment
The Tax Reform Act of 1986		
Before 1986 Act	37.8	37.8
1986 Act	44.8	44.6
Effect of 1986 Act	+7.0	+6.8
Limiting Capital Gains Tax Rate to Flat 15 Percent Rate		
1986 Act	44.8	44.6
Flat 15 Percent Rate	38.1	37.7
Effect of Flat 15 Percent Rate	-6.7	-6.9

SOURCE: Effects of technical refinements are taken from Table 2. Effects of aggregation adjustment are based on additional simulations by the Congressional Budget Office.

NOTE: Revenue reflects permanent rather than transitional effects of tax changes. Revenue effects include taxpayers' response to tax rate changes.

The negligible size of the aggregation adjustment is not sensitive to the assumption that all taxpayers respond according to the same parameter "a". As discussed above, while this is a reasonable assumption and consistent with limited comparable estimates, the actual response could differ systematically among taxpayers with different incomes. For the two tax changes simulated here, however, different responses among taxpayers with different incomes would have little effect on the simulations reported in Table 3.

The reason this effect would be negligible is that the full range of reasonable alternative distributions of the realizations response would still leave most realized gains in the same tax bracket. Nearly all gains realized by taxpayers in the absence of the 1986 act occur in the 28 percent bracket after the act. Thus, if the response parameter were higher among the very wealthy taxpayers and lower among others, more of the reduction in gains would shift to wealthy taxpayers. But because these taxpayers are also in the 28 percent tax bracket, the revenue effects of the act would be little changed. Even in the unlikely case that the revenue response were much higher among lower-income taxpayers, the revenue effects of the act would not be much different because the total amount of gains that reasonably could be reduced by such taxpayers is small. In short, since most capital gains realized in the absence of tax reform would occur in the 28 percent bracket after the 1986 act, most distributions of response to the 1986 act will have similar revenue effects.

For the proposal to reduce capital gains tax rates to a flat 15 percent rate, all plausible alternative assumptions for allocating the aggregate realization response among taxpayers would find the same revenue effect as reported in Table 3. This result occurs because only taxpayers whose tax rate is reduced would increase their realizations, and all of their increase would be taxed at the 15 percent rate. Thus, the assumption that the response parameter "a" is the same among all taxpayers is inconsequential for calculating the revenue effects of a 15 percent cap on capital gains tax rates.

IV. COMPARISON OF CBO AND OEP METHODS AS APPLIED TO ERTA

When the revised method for estimating revenue (described in Chapter III) is applied to the Economic Recovery Tax Act of 1981, that act causes a loss of $1.7 billion in capital gains revenue in 1984 relative to statutory 1980 law. This estimate contrasts with the Office of Economic Policy's finding that ERTA increased capital gains revenue by $1.7 billion relative to OEP's representation of 1980 law.

As mentioned above, the difference between the CBO and OEP estimates of the effect of ERTA arises from three main sources: different representations of 1980 law, OEP's inclusion of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) in its estimate of ERTA's effects, and different choices of how to measure marginal tax rates. Small differences in data bases also contribute to differences between the two estimates. The different representations of 1980 law contribute the most to the difference in the revenue estimates of ERTA, and OEP's representation rests on implausible assumptions. OEP's inclusion of TEFRA is the next largest contributor to the difference and clearly is inappropriate. Neither CBO's nor OEP's choice of how to represent marginal tax rates is clearly preferable, and the different choices contribute little to the difference in the revenue estimates.

This chapter begins with a review of capital gains tax changes from 1980 through 1984 and then presents an estimate of ERTA's revenue effect using the revised method discussed in Chapter III.[1] This estimate is then compared with OEP's corresponding estimate, and the sources of difference are delineated. The chapter concludes by pointing out the limitations of the existing revenue estimates for assessing the tax treatment of capital gains.

CAPITAL GAINS TAX CHANGES IN 1980-1984

The Economic Recovery Tax Act of 1981 was only one of three significant changes in capital gains tax rates between 1980 and 1984. Another legislative change was TEFRA's modification of the alternative minimum tax (AMT). The third, bracket creep, occurred indirectly as inflation and real income growth pushed taxpayers into higher tax brackets. These latter two changes raised tax rates on capital gains, whereas ERTA lowered rates.

[1] The CBO simulations did not include the revenue effects of the Revenue Act of 1978, although these effects were also simulated by OEP. CBO was originally asked to investigate the 1986 act and a proposal to reduce current tax rates on capital gains to 15 percent. The CBO simulations of ERTA presented in this paper are part of an evaluation of OEP's criticisms of CBO's earlier simulations, and provide an adequate basis for comparing CBO's and OEP's methods without simulations of the 1978 act. However, no inferences about the 1978 act's revenue effects should be drawn from CBO's simulations of later tax changes. The tax changes in that act were unique, particularly the cuts in top rates from historically unmatched levels.

ERTA lowered the top marginal tax rate on individual income from 70 percent to 50 percent, reduced other marginal tax rates by 23 percent over a three-year period, and included a number of other provisions that reduced individual tax payments and lowered taxes on the business income of both individuals and corporations. The reduction in the top individual rate from 70 percent to 50 percent, when combined with the continuing deduction of 60 percent of long-term gains, lowered the top rate on long-term gains from 28 percent to 20 percent. To keep the top rate on these gains consistent between the AMT and the regular schedule, the act also lowered the top rate in the AMT to 20 percent. The 23 percent reduction in other tax brackets reduced marginal capital gains tax rates for taxpayers in these brackets.[2]

TEFRA increased capital gains taxation largely by broadening the base of the AMT.[3] Before TEFRA, the base of the AMT was taxable income from the regular income tax plus two types of preference income--the 60 percent of capital gains excluded from the regular tax, and certain itemized deductions in excess of 60 percent of gross income. The 1982 act broadened the base in several ways: it required that the full amount of certain itemized deductions be included instead of just the excess amount; it transferred several preferences from the base of the "add-on" minimum to the AMT base and then repealed the "add-on" minimum; and it added several new preferences to the base.

TEFRA also altered the rate structure of the AMT. Before TEFRA, the AMT rate structure included a $20,000 exemption, a 10 percent bracket on AMT income between $20,000 and $60,000, and a 20 percent rate on additional AMT income. The 1982 act dropped the 10 percent initial bracket and raised the exempt amount to $30,000 ($40,000 for joint returns). The base broadening and rate changes raised the fraction of capital gains subject to tax and caused some taxpayers to start paying the AMT on their gains.[4]

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[2] A special provision of ERTA made the 20 percent top rate on long-term gains effective for gains realized after June 9, 1981. The top rate on other income was lowered to 50 percent starting in 1982, and the rate reductions in other brackets were phased in between 1981 and 1984.

[3] The AMT was due only if liability under the AMT was greater than the amount otherwise due under both the regular income tax and the "add-on" minimum tax. The AMT was enacted in 1978 when the untaxed portion of capital gains was removed from the "add-on" minimum tax. At that time, the AMT exempted the first $20,000 of AMT income, applied a 10 percent rate to AMT income between $20,000 and $60,000, a 20 percent rate to AMT income between $60,000 and $100,000, and a 25 percent rate to AMT income above $100,000. ERTA eliminated the 25 percent rate as of 1982. The TEFRA changes were effective starting in 1983. The "add-on" minimum tax was enacted in 1969 and included capital gains and several other items of tax preference in its base.

[4] Other changes in TEFRA and later legislation probably had minor influences on capital gains taxation. TEFRA took several steps to improve taxpayer compliance. Some of the changes affected capital gains directly, and others may have had indirect effects because of generally heightened taxpayer awareness. Higher capital gains tax rates for a few taxpayers also resulted from limitations of medical deductions in TEFRA, and the inclusion of some Social Security benefits in taxable income as a result of the 1983 legislation on Social Security. Compliance provisions in the Deficit Reduction Act of 1984 may also have indirectly improved capital gains reporting starting in 1984.

In addition to these legislated changes, inflation and real economic growth continually pushed taxpayers into higher tax brackets. Between 1980 and 1984, average taxable personal income rose 27.5 percent. Indexation of rate brackets, the zero bracket amount, and personal exemptions, however, did not begin until 1985.

CBO'S ESTIMATE OF ERTA'S EFFECT ON CAPITAL GAINS REVENUE

In its analysis, CBO measures the revenue effect of ERTA as the difference in revenues between tax law as amended by that act and prior law. Revenue under each of these laws is estimated from the same tax returns to eliminate other influences on capital gains revenue. The IRS's representative sample of 80,000 returns for 1984 is used because 1984 is the first year in which ERTA's tax reductions were fully phased in. The returns are the same ones used for the revenue estimates in Chapter III, except that they are not inflated to 1988 levels.

Representation of ERTA Law and Prior Law in 1984

ERTA law--that is, tax law as amended by ERTA--differs from the law actually in place in 1984. The main difference for capital gains taxation, as noted above, is TEFRA's change in the alternative minimum tax which took effect in 1983.

Tax law before ERTA is the law in effect as of 1980. Two alternative representations of 1980 law are used here: statutory law and indexed law. Statutory law is prior law as enacted, while indexed law increases the 1980 law's personal exemptions, zero bracket amount, and tax brackets widths for the 27.5 percent increase in average taxable personal income between 1980 and 1984.

Normal practice for revenue estimation is to represent prior law by the statute. Indexed law has been included here because OEP's representation of 1980 law has variously been explained as representing either statutory or indexed law. Prior law is normally represented by statutory law because it often is the most likely alternative to a proposal under consideration, because it is fully specified, and because use of a common prior law concept simplifies the interpretation of revenue estimates presented in a variety of circumstances. These considerations and the widespread use of statutory law in federal revenue estimating make it the preferred representation of prior law here. The argument for using indexed 1980 law to represent prior law is that by 1984, statutory 1980 law contained an implicit tax increase as a result of bracket creep and indexed law removes this increase. The question of how to represent prior law is not an issue in Chapter III because prior law in those cases is indexed.[5]

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[5] Indexation in the 1988 simulations is for price inflation rather than the income inflation used to index 1980 law. Price inflation is used for the 1988 simulations because that is the indexing prescribed by the laws being simulated. The difference between price indexing and income indexing is that real income growth, which also moves taxpayers into higher tax brackets, is included in income indexing. Both types of indexing give similar results over the 1980-1984 period because (continued...)

Table 4. Effect of ERTA on Capital Gains Revenue in 1984 as Estimated by CBO (In billions of dollars)

	Representation of 1980 Law	
	Statutory Law	Indexed Law
Revenues Under 1980 Law	20.9	20.1
Revenues Under ERTA Law	19.2	19.2
Effect of ERTA	-1.7	-0.9

SOURCE: Congressional Budget Office simulations.

NOTES: All revenue effects include taxpayers' responses to tax changes. Statutory law is the normal representation of prior law. Indexed law is included to facilitate comparison with OEP's revenue estimate.

The CBO Method

Capital gains revenue in 1984 is calculated under ERTA law and both statutory and indexed 1980 law using the revised CBO method described in Chapter III. Because none of these laws was in effect in 1984, actual realizations in 1984 are changed to reflect the tax law being simulated before revenues under that law are calculated. The change in realizations is determined by CBO's aggregate equation using the reestimated parameter "a" and the simulated change in the average marginal tax rate on capital gains between actual 1984 law and the law being simulated.

The revenue effect of ERTA is the difference in capital gains revenues between ERTA law and 1980 law. Capital gains revenue for 1984 under ERTA law is simulated to be $19.2 billion compared with $20.9 billion under statutory 1980 law--a loss of $1.7 billion relative to statutory 1980 law (Table 4). Had 1980 law been indexed between 1980 and 1984, 1980 law would have collected $20.1 billion in capital gains revenue in 1984. Thus ERTA lost $0.9 billion relative to indexed 1980 law.[6]

[5](...continued)
most of the 27.5 percent increase in average taxable personal income in those years resulted from the 25.7 percent increase in prices, as measured by the GNP price deflator.

[6] These estimated revenue losses from ERTA are substantially smaller than the $6.9 billion loss estimated in Chapter III for limiting capital gains rates in 1988 to 15 percent. ERTA's effect in 1984 is smaller, partly because it occurs on a smaller base of realized gains and partly because its reduction in tax rates is smaller than that under the proposed 15 percent rate.

The use of statutory rather than indexed 1980 law increases the revenue loss attributed to ERTA by $0.8 billion ($1.7 billion less $0.9 billion). This increase results from bracket creep, which raises 1984 capital gains revenue under statutory 1980 law to $20.9 billion compared with revenue under indexed 1980 law of $20.1 billion.

	1984 Capital Gains Revenue (Billions of dollars)
Statutory 1980 Law	20.9
Indexed 1980 Law	20.1
Effect of Bracket Creep	0.8

Sensitivity of Revenue Estimate to Allocation of Response Among Taxpayers

The revised CBO simulation method allocates the aggregate response among taxpayers by assuming that parameter "a" is the same among all taxpayers. While this assumption is consistent with the estimation in the CBO report, it is not the only possible allocation. Other reasonable allocations, though, also find that ERTA causes revenue to fall.

The allocation with the smallest revenue loss assumes that all of the response is among taxpayers in the highest tax bracket, even though ERTA cut tax rates across the board. ERTA's revenue loss under this extreme allocation is calculated as follows. Under statutory 1980 tax law, CBO calculates 1984 realizations to have been $121.1 billion, yielding $20.9 billion in revenue. If taxpayers had kept their realizations at this level in spite of ERTA's rate reductions, revenue would have fallen by $4.3 billion. According to CBO's aggregate equation, however, those rate reductions caused taxpayers to raise their 1984 realizations by $18.5 billion. Had this entire increase in realizations come from taxpayers in the top tax bracket (paying 20 percent on additional capital gains), the additional realizations would have raised $3.7 billion in revenue. This amount offsets most of the revenue loss from the rate decline, but still leaves a net loss from ERTA of $0.6 billion.[7]

Less extreme allocations of the aggregate response would show larger revenue losses. If some of the realizations response went to taxpayers below the top bracket, some of the increased realizations would be taxed at less than the 20 percent rate, and the net loss from the act would be closer to the loss calculated under the assumption that taxpayers did not respond to the lower tax rate. Relative to statutory law, this "no-response" loss is $4.3 billion.

[7] When similar calculations are made relative to indexed 1980 law, the extreme allocation finds no net revenue effect. The $3.0 billion revenue loss resulting when realizations remain constant is just offset by $3.0 billion in increased revenue from the $14.8 billion increase in realizations among taxpayers in the 20 percent tax bracket.

The loss of revenue from ERTA under the CBO method is only slightly greater than that under the extreme allocation. This result occurs because the CBO procedure itself allocates almost 60 percent of the change in realizations to taxpayers who would be in ERTA's top tax bracket. CBO's allocation of the change to the top bracket is this large because the rate reductions were largest for top-bracket taxpayers, and these taxpayers realized a large share of the gains to begin with.

OEP'S ESTIMATE OF ERTA'S EFFECT ON CAPITAL GAINS REVENUE

Unlike CBO, OEP measures ERTA's revenue effect without using microsimulation. OEP avoids microsimulation by representing ERTA law and 1980 law by taxes actually paid in particular years. Thus, OEP represents ERTA law by realizations and revenues actually collected in 1984 and represents 1980 law by the average and marginal tax rate actually observed for 1980.

One of OEP's revenue calculations is shown in Table 5 to illustrate OEP's method and to provide a base for comparison with the CBO estimates. The calculation uses the response parameter from Equation 2, Table 10, of the CBO report, which corresponds to the one used in the CBO simulations reported in this chapter. According to OEP's calculations, revenue in 1984 is $1.7 billion greater than it would have been under 1980 law, all of which OEP attributes to the effects of ERTA.

OEP starts from actual realizations and revenues in 1984. In that year, $138.7 billion in long- and short-term gains were realized, and Treasury calculates revenues on these gains to have been $21.5 billion. OEP then calculates what revenues would have been if 1980 law had prevailed in 1984. The first step is to adjust realizations for the higher marginal tax rates that taxpayers would have faced under 1980 law. OEP uses the CBO report's independent marginal tax rates in 1980 and 1984, which show the 1980 rate to be 4.6 percentage points above the 1984 rate. If marginal tax rates had been this much higher in 1984, realizations would have been reduced to $120.2 billion under 1980 law. OEP then calculates capital gains revenues from these realizations by assuming that the average tax rate on these gains in 1984 would be the same as it actually was in 1980. An average tax rate on capital gains in 1980 of about 16.5 percent is used which, when applied to $120.2 billion in realizations, yields $19.8 billion in revenue. This amount is $1.7 billion below actual 1984 capital gains revenues, so OEP concludes that ERTA raised revenues from capital gains by $1.7 billion in 1984.

These OEP calculations are based on data from the 1985 Treasury report and subsequent tabulations by the Treasury Department. The data differ slightly from data used in the CBO simulations. For example, the Treasury report included both short- and long-term capital gains whereas the revised CBO revenue simulations use just long-term gains. The Treasury report also included an average tax rate for 1980 constructed from a few aggregate groups of taxpayers rather than from the IRS's 1980 sample of taxpayers. To facilitate comparison with the CBO simulations, the OEP calculations are reestimated using the CBO data. The recalculation raises OEP's estimate of the gain from ERTA from $1.7 billion to $2.4 billion (see Table 5).

Table 5. Effect of ERTA on Capital Gains Revenue As Estimated by OEP and Reestimated with CBO Data

	OEP Method with OEP Data	OEP Method with CBO Data
Marginal Tax Rates (Percent)		
1984 law	14.0	14.2
1980 law	18.6	18.5
Change	-4.6	-4.3
Response Parameter	-0.0310	-0.0305
Realized Gains (Billions of dollars)		
1984 law	138.7	135.7
1980 law	120.2	118.4
Change	18.4	17.3
Average Tax Rates (Percent)		
1984 law	15.5	15.1
1980 law	16.5	15.3
Change	-0.9	-0.2
Revenue (Billions of dollars)		
1984 law	21.5	20.5
1980 law	19.8	18.1
Change	1.7	2.4

SOURCE: The estimate is from the Office of Economic Policy; the reestimate is from Congres-sional Budget Office calculations and simulations.

NOTE: Both the estimate and reestimate use the 1980 average tax rate and independent marginal tax rate to represent 1980 law.

DIFFERENCES IN THE CBO AND OEP REVENUE ESTIMATES

As stated above, the CBO and OEP revenue estimates differ for three major reasons. Two reflect fundamental differences in the representations of ERTA and of 1980 law. The third reason simply reflects a different choice in how best to measure marginal tax rates.

The three differences arise because CBO relies on microsimulation, while OEP avoids it. Because CBO uses microsimulation, it can represent ERTA law in 1984 by the specific provisions of the tax law as amended by ERTA. In contrast, OEP must represent ERTA law by the actual law in effect as of 1984, which also includes TEFRA. In addition, CBO can represent 1980 law in 1984 with the specific provisions of the tax law in effect in 1980, whereas OEP must assume that the average and marginal tax rates occurring in 1980 would be adequate representations of 1980 law in 1984. Finally, CBO chooses to calculate marginal tax rates from microsimulation, while OEP must rely on the independent marginal tax rates.

The contribution of each of these differences to the two revenue estimates is shown by adjusting the CBO simulations for each of the differences. For this purpose, the CBO simulation results relative to statutory 1980 law are presented in Table 6 using the same format as the OEP calculations. In the CBO simulations, ERTA reduced marginal tax rates an average of 4.7 percentage points relative to statutory 1980 law, and caused realizations to increase by $18.5 billion. The combination of the tax rate decrease and the realizations increase is simulated to have reduced capital gains revenue by $1.7 billion, as reported above. The three major reasons for the difference between this revenue loss and the corresponding $2.4 billion gain indicated by the OEP method are taken up in turn.

Representation of ERTA Law

The Office of Economic Policy represents ERTA law in 1984 with the tax law actually in effect in 1984. Following this assumption, OEP attributes to ERTA the full change in revenues between the tax laws of 1980 and 1984. However, 1984 law and revenues include the effects of TEFRA as well as ERTA. Thus OEP's estimate of the 1981 act is actually an estimate of the combined effects of ERTA and TEFRA.

CBO's revenue estimates of ERTA and TEFRA together are $1.3 billion higher than its estimates of ERTA alone. When CBO's simulations are based on 1984 law instead of ERTA law, marginal tax rates are higher and realizations are lower than under ERTA law, reflecting TEFRA's increases in the AMT. Lower realizations plus the higher AMT taxes raise capital gains revenue in 1984 to $20.5 billion. Thus TEFRA raised 1984 revenue by $1.3 billion relative to the $19.2 billion that would have been collected under ERTA law alone. Furthermore, the $20.5 billion raised by ERTA and TEFRA in 1984 is just $0.4 billion below that which

Table 6. Effect of ERTA and ERTA Plus TEFRA on Capital Gains Revenue as Estimated by CBO

	ERTA		ERTA plus TEFRA
Marginal Tax Rates (Percent)			
ERTA law	15.5	1984 law	16.5
1980 law	20.2	1980 law	20.2
Change	-4.7	Change	-3.7
Response Parameter	-0.0305		-0.0305
Realized Gains (Billions of dollars)			
ERTA law	139.6	1984 law	135.7
1980 law	121.1	1980 law	121.1
Change	18.5	Change	14.6
Average Tax Rates (Percent)			
ERTA law	13.8	1984 law	15.1
1980 law	17.3	1980 law	17.3
Change	-3.5	Change	-2.2
Revenue (Billions of dollars)			
ERTA law	19.2	1984 law	20.5
1980 law	20.9	1980 law	20.9
Change	-1.7	Change	-0.4

SOURCE: Congressional Budget Office simulations.

NOTE: Statutory 1980 law is used to represent 1980 law.

would have been raised under statutory 1980 law. Thus use of actual 1984 law, instead of ERTA law alone, has the effect of raising the CBO revenue estimate from a loss of $1.7 billion to a loss of just $0.4 billion (see Table 6).[8]

The $1.3 billion revenue increase that CBO estimates to have resulted from TEFRA is nearly as large as the $1.7 billion revenue loss CBO attributes to ERTA (comparing statutory change with statutory change). This similarity in size may seem surprising because the tax changes in ERTA were much larger than in TEFRA. However, the rate reductions in ERTA affected marginal rates more than did the base broadening of TEFRA, so ERTA is simulated to elicit more of an offsetting realization response. Furthermore, the standard procedure for measuring revenue attributable to capital gains tends to give high estimates to base broaden-

[8] Relative to indexed 1980 law, CBO estimates that ERTA and TEFRA together raised $0.4 billion instead of the $0.9 billion lost by ERTA alone.

ing, because it allocates the income exemption of the AMT to the other sources of AMT income first and to capital gains only if the exemption exceeds other income.

Though it is possible to remove the effects of TEFRA from 1984 law using the CBO method, it is impossible using the OEP method. The reason is that OEP's method relies on the actual realizations and revenues for 1984, which include the effects of TEFRA. As a result, the comparisons of the CBO and OEP methods that follow are based on simulations that include the effects of TEFRA along with ERTA in 1984. That is, the effects of different marginal tax rate measures and of different representations of 1980 law are evaluated for the combined changes of ERTA and TEFRA.

Choice of Marginal Tax Rate

Both CBO and OEP calculate the realization response to tax law changes using the equation estimated in the CBO report and described in Chapter III of this paper. In that equation, the realization response is determined by the product of the parameter "a" and the change in the average marginal tax rate. To calculate the response, OEP uses the independent marginal tax rate described in Chapter III, while CBO uses the average of the marginal tax rate changes among the 80,000 returns in its simulations.

The independent and simulated marginal tax rates differ, and these differences result in different taxpayer responses to the same tax law change. Consider the change between statutory 1980 law and 1984 law just reported in Table 6. There, the simulated average marginal tax rate declined by 3.7 percentage points. When the independent marginal tax rate for 1984 law is compared with one constructed for the same year using 1980 law, the decline is 4.7 percentage points. As may be seen from Table 7, the larger measured decline in marginal tax rates causes a larger realization response and raises the revenue effect of the combined ERTA and TEFRA tax changes from a $0.4 billion loss to a $0.2 billion increase.

Neither the independent nor the simulated marginal tax rate is unambiguously preferable. The simulated marginal tax rate is more precise. Thus, so long as the estimate of "a" is unbiased, the simulated marginal tax rate introduces less error than the independent marginal tax rate. Furthermore, use of the simulated marginal tax rate is more consistent with the revenue calculations simulated on the same returns. The independent marginal tax rate is more consistent with use of the parameter "a", however, because it was used to estimate "a". For example, if the independent marginal tax rate method consistently understated the change in marginal tax rates, the parameter "a" would have been estimated to be larger than it actually is. Use of the overstated "a" with the simulated rate would overstate the response. Since the nature of the errors in the independent tax rate and the parameter "a" are unknown, it is impossible to tell whether the independent or the simulated marginal tax rate produces the better estimate of how much total realizations change in response to changes in the tax law. Fortunately, the revenue calculations based on the two measures of marginal tax rates yield similar results.

Table 7. Effect of ERTA Plus TEFRA on Capital Gains as Estimated Using the CBO and OEP Methods

	CBO Method		OEP Method
	With Simulated Marginal Tax Rates	With Independent Marginal Tax Rates	Reestimates with CBO Data
Marginal Tax Rates (Percent)			
1984 law	16.5	14.2	14.2
1980 law	20.2	18.7	18.5
Change	-3.7	-4.7	-4.3
Response Parameter	-0.0305	-0.0305	-0.0305
Realized Gains (Billions of dollars)			
1984 law	135.7	135.7	135.7
1980 law	121.1	118.8	118.4
Change	14.6	16.9	17.3
Average Tax Rates (Percent)			
1984 law	15.1	15.1	15.1
1980 law	17.3	17.1	15.3
Change	-2.2	-2.0	-0.2
Revenues (Billions of dollars)			
1984 law	20.5	20.5	20.5
1980 law	20.9	20.3	18.1
Change	-0.4	0.2	2.4

SOURCE: Congressional Budget Office simulations.

NOTE: To represent 1980 law, the CBO method uses statutory 1980 law; the OEP method uses the average tax rate and the independent marginal tax rate of 1980.

Representation of 1980 Law: Main Source of Difference

The Congressional Budget Office represents 1980 law in 1984 by applying statutory 1980 law to 1984 tax returns. In contrast, OEP represents 1980 law in 1984 with marginal and average tax rates calculated from 1980 tax returns. This difference accounts for the largest portion of the difference between the CBO and OEP revenue estimates. OEP's choice for representing 1980 law in 1984 is based on implausible assumptions about changes between 1980 and 1984. That choice is necessary, however, given OEP's decision not to use microsimulation.

The different representations of 1980 law cause a difference of $2.2 billion in the CBO and OEP revenue estimates of ERTA and TEFRA together. The main source of this difference is that the different representations of 1980 law produce different estimates of what the average tax rate on capital gains would have been in 1984 had 1980 law not been changed. Using the OEP method, the average tax rate

on capital gains in 1980 is 15.3 percent compared with 17.1 percent rate when 1980 tax law is applied to 1984 tax returns (see Table 7).[9] Applying the lower average tax rate of 15.3 percent causes OEP to find that 1980 law would have raised less revenue in 1984 than was found by CBO. This finding in turn causes OEP to estimate that ERTA and TEFRA together raised $2.2 billion more revenue relative to 1980 law than would be the case if the CBO method had been used.[10]

OEP's use of the marginal and average 1980 tax rate to represent 1980 law in 1984 requires accepting one of two implausible assumptions. One is that the distribution of realized gains would have remained constant between 1980 and 1984 if statutory 1980 tax law remained in effect. The other is that, in the absence of ERTA and TEFRA, the 1980 tax law would have been indexed in an unprecedented way that kept average capital gains tax rates at their 1980 level. The two assumptions are explored in turn.

Statutory Law and an Unchanging Distribution of Realized Gains. Following Treasury's earlier use of the method, OEP assumes that both statutory 1980 law and the distribution of realized gains would remain unchanged in the absence of the ERTA and TEFRA tax changes. These assumptions together keep the 1984 average tax rate on capital gains at its 1980 level.

The distribution of realized gains, however, would almost certainly have shifted toward higher-bracket taxpayers between 1980 and 1984 if statutory 1980 law had remained in effect. To begin with, inflation and real income growth would tend to push all taxpayers, including those with capital gains, into higher tax brackets. This bracket creep would have raised the average tax rate above its 1980 value by 1984. Had OEP used a higher, more plausible, average tax rate to represent 1980 law, OEP's revenue effect of ERTA and TEFRA would be lower and closer to CBO's.[11]

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[9] When 1980 law is applied to 1984 tax returns, the 1984 tax returns have realizations adjusted to reflect 1980 tax rates on capital gains.

[10] The lower average tax rate in 1980 causes OEP to conclude that 1980 law, if it was still in effect in 1984, would raise just $18.1 billion from taxing long-term capital gains. This finding contrasts with CBO's application of 1980 law to 1984 tax returns, which finds revenues of $20.3 billion. Actual capital gains revenue in 1984 totaled $20.5 billion; OEP's method indicates that TEFRA and ERTA raised $2.4 billion relative to 1980 law while CBO's method, using the independent marginal tax rate, finds the two laws raising just $0.2 billion. Table 7 summarizes these calculations.

The different representations of 1980 law also cause differences in marginal tax rates. OEP uses the independent marginal tax rate from 1980, and CBO uses an independent marginal tax rate for 1980 law applied to 1984 tax returns. The different marginal tax rates have little quantitative effect on the revenue estimates because they turn out to be quantitatively close--18.7 percent for CBO and 18.5 percent for OEP's method using CBO data (see Table 7). The marginal tax rates are similar because the weights used in constructing the independent marginal tax rate are similar in 1980 and 1984. No such similarity, though, applies to construction of average tax rates in those years.

[11] The upward shift in the distribution of realized gains between 1980 and 1984 does not force the independent marginal tax rate to rise much above its 1980 level, because this rate is constructed from weights that change little between 1980 and 1984 in spite of the changing distribution of gains.

Table 8. Distribution of Long-Term Gains, By Income, 1980 and 1984

Adjusted Gross Income	Long-Term Gains (Billions of dollars)		Distribution (Percent)	
	1980	1984	1980	1984
All Taxpayers	70.2	135.7	100	100
Under $100,000	42.2	61.8	60	46
Over $100,000	28.1	73.8	40	54

SOURCE: Internal Revenue Service, *Statistics of Income, Individual Income Tax Returns*, 1980 and 1984.

In addition, by 1984 the distribution of realized gains under 1980 law would have shifted to higher tax brackets because of the disproportionately large surge in realizations that occurred among higher-income taxpayers. Among taxpayers with incomes over $100,000, realized gains jumped by $45.7 billion between 1980 and 1984, while among lower-income taxpayers over the same years realizations increased just $19.6 billion (see Table 8). As a result of the larger increase in gains among higher-income taxpayers, their share of realized gains rose from 40 percent in 1980 to 54 percent in 1984. This increased share is larger than can be explained by the effects of ERTA and TEFRA. OEP calculates that ERTA and TEFRA raised 1984 realizations by $18.4 billion (see Table 5). If the entire increase came from taxpayers with incomes over $100,000, these taxpayers in the absence of ERTA and TEFRA would have realized $55.4 billion in long-term gains.[12] This amount exceeds 1980 realizations of higher-income taxpayers by more than the amount attributable to inflation, and it is enough to raise the share of gains realized by higher-income taxpayers from 40 percent in 1980 to 47 percent in 1984. The rapid rise in realizations among the higher-income taxpayers is probably attributable to the rapid rise in corporate stock prices, since stock ownership is concentrated among the wealthy.

As with bracket creep, the surge in realized gains among higher-income taxpayers would have caused the average tax rate in 1984 to be higher than its observed value in 1980, even if 1980 law had not changed. If OEP had used a higher average tax rate to represent 1980 law in 1984, OEP's revenue estimate of ERTA and TEFRA would have been lower and closer to CBO's. Clearly, because of bracket creep and the surge in realizations among higher-income taxpayers, OEP's assumption that the distribution of realized gains would have been unchanged after 1980, if statutory 1980 law had remained in effect, is implausible.

[12] The $55.4 billion results from subtracting OEP's estimated $18.4 billion change in realizations from $73.8 billion, the 1984 realizations of taxpayers with incomes over $100,000 (see Table 8).

Indexing to Keep Capital Gains Tax Rates Constant. The alterantive rationale for representing prior law by the average and marginal tax rates of 1980 is that 1980 law would have been indexed in the absence of ERTA and TEFRA. However, indexation of 1980 law for the increase in average taxable personal income would not have kept the average tax rate on capital gains at its 1980 level. When CBO applies indexed 1980 law to 1984 tax returns (after removing the tax-induced increase in realizations), the average capital gains tax rate is calculated to be 15.9 percent instead of the rate observed for 1980 of 15.3 percent. The average tax rate on gains would have risen between 1980 and 1984 even if 1980 law had been indexed, because the shift in the distribution of gains to higher-income taxpayers by 1984 was larger than can be accounted for by inflation and the changes in tax law. Thus, to maintain the 1984 average capital gains tax rate at its 1980 level would have required an implausible form of indexing targeted on the capital gains tax rate. If OEP had used a normal form of indexing such as that used by CBO, their average tax rate for 1980 law in 1984 would have been higher, and their revenue estimate of the 1980 to 1984 tax changes would have been closer to CBO's.[13]

PUTTING THE REVENUE SIMULATIONS IN PERSPECTIVE

The revenue findings in this report apply to the 1986 act, ERTA, and a proposal made in 1988 for a flat 15 percent rate on capital gains. The recent proposal by President Bush differs in some important ways from the 1988 proposal, and therefore the revenue findings in this paper are only generally indicative of the revenue effects of his proposal. Revenue estimates of the President's proposal have been made by the Joint Committeè on Taxation and the Treasury Department.

While the analysis in this paper supports the revenue findings of the CBO report and refutes OEP's findings for ERTA, these findings have some limitations. First, the findings depend critically on estimates of taxpayer response to changes in the capital gains tax rate. As noted in the CBO report and in this update, however, none of the estimates of this response is precise enough to rule out alternative revenue effects. Further study and evidence may lead to improved estimates showing more or less response from taxpayers than that identified in the CBO report. Such estimates could, for example, either reverse the CBO finding that a flat 15 percent rate would lose revenue or make the estimated revenue loss even greater.

Moreover, taxation of capital gains affects revenues in ways not measured in this paper or in the many related studies discussed in CBO's earlier report. For example, reintroduction of a preferential tax rate for long-term capital gains could reduce revenue by shifting the composition of income from ordinary income to capital gains (if, for example, corporations reduce dividends and increase retentions) or could increase revenue if lower capital gains taxes stimulate economic growth.

Finally, revenue is only one aspect of capital gains taxation that policymakers need to consider. Other aspects include the distribution of the tax burden, investment choices, business incentives, and economic growth.

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[13] Nor can too low an average tax rate be justified by an offsetting low value for the marginal tax rate. The independent marginal tax rate for 1980 is nearly as high as the independent rate for 1980 law applied to 1984 income.